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ABSTRACT

This study analyzed the ability of college students to bargain strategically in the financial aid process. A bargaining model of the financial aid process was developed and used to evaluate the effect of increased number of acceptances into different colleges on a student's financial aid package. A theoretical model was developed using a first-price sealed auction model. This model was evaluated using empirical evidence from the 1996 National Postsecondary Student Aid Study, which contains details about the composition and quantity of students' financial aid; demographic, financial, and opinion data from students and their families; and institutional data from the college the student is attending. Data analysis indicated that an increase in acceptances increases student financial aid. The results indicate that the financial aid process needs to be analyzed not only from the strategic perspective of the college, but also from the student's strategic perspective. Students can maximize their financial aid offers by increasing the number of schools to which they are accepted. Many students are currently under-applying due to lack of information discussing strategy from their perspective. (Contains 21 references.) (SM)

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ED 445 636

Financial Aid and Student Bargaining Power

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Abstract

Financial Aid and Student Bargaining Power

It is an understatement to say that financial aid is a key component of the college admissions process. For the student and her family, financial aid is a way to afford to quality post secondary education that otherwise may have been unobtainable. For the college, financial aid is a method to obtain the best and brightest students regardless of financial status. For policymakers, financial aid is a subsidy for educational expenses where constituencies often differ over its merits. This research attempts to analyze the financial aid process by considering the ability of a student to act strategically through the bargaining process. A theoretical model is developed using a first-price sealed auction model. This model is evaluated using empirical evidence from the 1996 National Postsecondary Student Aid Study (NPSAS:96). It is shown that a student can maximize her financial aid offer by increasing the number of schools she has been accepted to after controlling for ability, demographics, and institutional characteristics.

Financial Aid and Student Bargaining Power

Introduction

To make the American Dream achievable for all, we must make college affordable for all.

-President William J. Clinton, 2000 State of the Union Address

The National Center for Education Statistics estimates that 56.4% of the 7.4 million full-time undergraduate students in the United States receive some type of financial aid.[1] This research will use the NPSAS data to model the effect of financial aid amounts and composition on choice of college. By composition, I mean the make-up of a student's financial aid package in terms of percentages of loans and grants. This can be viewed as a game theoretic model with the student and the universities that the student was accepted at as the players. I propose that once the student has been accepted to some subset of the universities to which he/she applied, a new market has been created with the student as the sole buyer in this market and the subset of schools as the sellers. If the student was only accepted at one school, then the student has very little bargaining power in terms of acquiring a good price, which in this market, is represented by a favorable financial aid package. If, on the other hand, the student has been accepted at four colleges, for example, then the student has the ability to bargain with these schools for the best deal possible. In other words, the market changes from looking like a monopoly to looking more like a competitive market. In addition, these results may help address the issue of price sensitivity for college quality. I expect to find that students who were accepted at most of the institutions to which they applied will have more favorable financial aid packages than those

[1] U.S. Department of Education (1997).

students who were accepted only at the institution they are attending. The idea here is that with multiple acceptances, the student has gained some bargaining power in the financial aid process.

Many of the families with students receiving financial aid are already aware of the procedure involved in obtaining financial aid by the time they are applying for college admission. Most of these colleges require interested students to fill out detailed financial information forms including both federally mandated forms and college-specific forms. Once these forms have been processed, the school comes up with a financial aid package for the student. This "package" consists of a combination of different types of aid, such as grants, loans, work-study, and other miscellaneous aid.[2] What most families do not completely understand is how this package is determined.

While colleges have some restrictions on what they can and cannot do in terms of financial aid, they also have a lot of freedom to choose their own financial aid policies. One set of restrictions involves the loan amounts that the school can award its students. Currently, there is a cap on subsidized loans at $2,625 for Freshmen, $3,500 for Sophomores, and $5,500 for Juniors and Seniors, a cap on unsubsidized loans at $4,000 for Freshmen and Sophomores and $5,000 for Juniors and Seniors, and a cap on Perkins[3] loans at $3,000 for all students. In addition, there is an overall limit on total borrowed money that an undergraduate dependent student can have at $23,000. Restrictions on work-study aid are less specific. Students can devote no more than 20 hours per week to this program; however, schools can choose the hourly wage.

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[2] By grants, I am including all forms of direct gift aid to the student, in other words, a dollar for dollar reduction in the student's bill to the college. Loans here include student loans, both subsidized and unsubsidized. Parent loans are considered other aid.

[3] Federal Perkins loans are low interest loans for students with exceptional need.

Other than these restrictions and a few others insuring that there is no unfair discrimination in the process, the colleges can choose both the level and composition of the financial aid package. For example, schools do receive a report from the government based on their formula that indicates the "expected family contribution" (EFC). This is a figure that measures how much a family can reasonably afford to pay for college. It is calculated based on a complicated formula that includes such things as parent and student assets and income, number of family members in college, etc. This EFC, however, is only used by most colleges as a guideline for financial aid, not a rule. Schools generally use their own financial aid forms in conjunction with this government-reported EFC to arrive at their own financial aid package.

As can be imagined, there are often substantial differences in the financial aid offerings from different schools to the same student. One reason for these differences is the different formulas used by these colleges as suggested previously. Another reason is that schools often take the quality of the student into account when making these decisions. For example, we will consider the following example from a selective private college. This school calculates the expected family contribution based on their own formula. This formula is generally more generous to the student than the government's suggested EFC. Along with this formula, the university then attaches a "quality rating" to the student ranging from A to G based on the student's application for admission. The application contains detailed information including test scores, grades, and extra-curricular activities. Using all of this information, the school then develops the financial aid package for the student. A student with a high quality rating will receive more total aid and, in addition, the aid that he/she is offered consists of a higher proportion of grants than a lower-rated student's.

The process would appear fairly straight-forward if it ended here. However, in many cases, families will negotiate with the colleges in an attempt to acquire a better financial aid offer. This can be accomplished in several ways. The families may have additional information that suggests the need for more aid than was offered originally. An example of this might be large medical bills or a change in family structure. The other method used in the bargaining process is forcing the schools to compete with one another. A student may indicate to a school that he/she was accepted that a second school has offered more aid and ask them to meet or beat this package. This is where the strategic behavior of this process enters. Although many publicly deny it, colleges may engage themselves in this bargaining game with the students. This essay investigates whether or not there is evidence of this game. Going back to our example of the selective private college, their financial aid office has indicated that once a student is accepted for admission, they will do everything within reason to insure that the student attends. In other words, they will compete for students with other schools. They further indicate that if a student says that he/she will go to another school that is offering a better financial aid package and provide proof, then they will usually meet or beat this offer, regardless of the other school in question. Even Harvard University now calls its need-based financial aid policies "competitively supportive" and asks its students to ask Harvard to meet offers of aid from other leading institutions.[4] In the following section, I will attempt to model this process.

[4] McPherson and Schapiro testimony before the Committee on Governmental Affairs (2000).

The Model

Here I develop a bargaining model of the financial aid process. This model will be used to evaluate the effect of increased acceptances on a student's financial aid package. My thought here is that if a student gets accepted into a relatively large number of colleges/universities, then that student has gained some bargaining power that will present itself through a more favorable financial aid package for that student.

In order to do this, I will use the first-price sealed auction model and literature.[5] Consider n potential schools attempting to get a particular student to enroll. These are schools to which a student has applied and at which she has been accepted. I will assume that each heterogeneous student is in a market all by herself once they have reached this point in the college admissions process. These n schools will play by the rules of a first-price sealed auction. Each school submits a bid, (i.e. a financial aid package), and the student attends the school that yields the highest utility, (some function of tuition, financial aid, application costs, and school characteristics). If the schools knew the willingness to pay of the other schools in this game, it would be optimal for the school with the highest valuation to slightly outbid the other n-1 schools.

Assuming, however, that the schools' valuation of the student is private information, we now have a game with incomplete information. Assume that the schools' valuations of the student lie in the interval [0, V], and that the probability of having a particular valuation, v_i, is the same for all schools. This valuation reflects the dollar amount that the specific student is worth

[5] I have chosen to use the first-sealed bid auction in this model. In my opinion, this is the model the most closely resembles the market for financial aid that I am observing. The same analysis can be done using the second-sealed bid auction, or Vickrey auction. The results of the model would not change, nor would the discussion that follows it.

to the specific university. This amount can reflect many different attributes of the student that the school deems important including the student's aptitude, potential for the future, expected future alumni contributions, and contribution to the diversity of the student body. This valuation is indexed by bidder (i.e., by college) illustrating the fact that each school may have a different measure of valuation.

The schools' valuations are being drawn randomly from this interval according to a uniform probability distribution represented by $F(v) = v/V$ *for* v *in the interval* $[0, V]$. Schools' types are just their valuations. Thus, the probability of any specific combination of types below $(v_1, \ldots, v_n)$ is $F(v_1)* \ * \ *F(v_n)$. Each school has a strategy that is a bid, b_i (i.e. the financial aid offer). The payoff for school i from bids $(b_1, b_2, \ldots, b_n)$ is:

$v_i - b_i$ *if* $b_i = max\{ b_1, b_2, \ldots, b_n\}$

0 *otherwise*

We know from the previous literature concerning this set of assumptions and the first-price sealed auction that if a school wants to maximize its payoff, then the optimal bid for the school is as follows[6]:

$$b_i^* = [(n-1)/n]v_i$$

It seems fairly straight-forward from this condition that as the total number of competing bidders, n, increases, the financial aid offer will also increase.[7] In other words, n is the number of colleges to which a student has been accepted. This result is usually used in the literature to point out that as the number of competitive bids increases, the optimal bid approaches the true

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[6] This result can be found in many papers and textbooks. For an example of such, see Eichberger (1993).

[7] The first derivative of this optimality condition is as follows:

$$\frac{\partial b_i}{\partial n} = \frac{v_i}{n^2} > 0$$

This holds true assuming that the school has a positive valuation for the student in question and that the student has been accepted to any number of schools.

valuation of the object being offered. In our case, we can say that the student will approach the financial aid offer that she deserves as she gets accepted to more and more schools. In other words, it is in the student's best interests to get accepted to as many schools as possible in order to maximize the financial aid that the student receives.

There are, of course, different ways in which this goal of large numbers of acceptances can be accomplished. One way is for the student to have characteristics that schools are typically looking for, such as successful grades, high standardized test scores, and involvement in extra-curricular activities. This is probably the best advice for students looking to get accepted into many schools. In terms of our model, this would increase the colleges' valuations of the student in addition to the number of schools accepting the student's application. Another way to increase the number of acceptances is to simply increase the number of schools to which a student applies. If a very solid candidate applies to only 2 colleges, she can, at most, get accepted into these 2 schools. Of course, completing applications to colleges and universities has become a fairly expensive process in some cases. In addition to the obvious opportunity costs of time involved with the writing of essays, gathering of recommendations and transcripts, and filling out resume-type information, there are often application fees that the student must pay. These fees typically range from $25 to $60. Therefore, if a student would simply apply to a school with the hopes of raising her eventual financial aid elsewhere, she must take into account the costs of applying compared to the expected gains in aid contingent on being accepted into one more school.

Turning attention to the student's decision, the student will want to maximize total utility, which will be defined as follows:

$$\Psi^* = U_i^* - mc - t_i^* + b_i^*(n(m))$$

c is the application cost (including opportunity cost) for each of the m colleges to which the student applies. t_i^* and b_i^* are the tuition and financial aid offered by school that the student actually attends. b_i^* is a function of the number of schools accepted to which in turn is a function of the number of schools to which a student applies. U_i^* is the utility that the student receives from going to this school regardless of cost to the student. In order to maximize total utility, ψ^*, the student should choose m such that the following relationship holds:

$$\frac{db_i^*}{dn}\frac{dn}{dm} = c$$

This first order condition states that the marginal financial aid received from an additional acceptance multiplied by the increase in acceptances from each additional application should be equal to the application cost in equilibrium. In other words, the student should continue applying to schools up to the point where the expected gain in aid from applying is equal to the costs of the application. Application costs do not vary in this model and we will assume that there is some constant ratio of acceptances to applications. In order to obtain a non-infinite number of optimal applications, the marginal financial aid received from an additional acceptance must be diminishing.[8] The gains in financial aid from more and more acceptances should fall.

[8] The second-order condition is as follows:

$$\frac{d^2 b_i}{dn^2} < 0$$

A Word about Market Structure

What market structure exists in higher education? This issue is addressed by looking at the degree of price discrimination in this marketplace. By offering different financial aid packages to different students, schools are engaging in some amount of price discrimination. Colleges are in a good position to price discriminate. They have downward-sloping demand curves due to the heterogeneity of colleges and they have the ability to identify the willingness to pay of their customers. For a student who is accepted is accepted into only one institution, the market is very close to being a monopoly where the college can make a take-it-or-leave-it offer to the student. If a student is accepted into multiple schools, however, the market changes from looking like a monopoly to looking more like a competitive market, or at least monopolistically competitive.

In May of 1991, the Justice Department reached a settlement with the eight Ivy League universities[9] to end alleged price-fixing for tuition and financial aid. This was a result of a 1989 civil antitrust lawsuit. Although the schools did not admit that they had done anything wrong in the past, they agreed to no longer "collude or conspire" on financial aid. Up until this point, the schools had held annual meetings to exchange financial aid and tuition information. MIT, also named in the lawsuit, did not join in the agreement.[10] In December of 1993, the Justice Department reached a settlement with MIT that allows colleges to exchange limited information concerning financial aid. With this agreement, schools that agree to admit students irrespective of finances may discuss financial aid policies but may not compare individual financial aid

[9] The Ivy League consists of Brown, Columbia, Cornell, Dartmouth, Harvard, Princeton, Pennsylvania, and Yale Universities.
[10] See Seper (1991).

awards.[11] Although the nine schools that make up the Ivy League and MIT are not nearly representative of all institutions of higher learning in the United States, looking at the results of this case do indicate the incentives inherent in the system. Since 1993, there has been a lot of discussion about 'price-discounting' in higher education. Price-discounting is when colleges give merit-based financial aid to students in an effort to compete with the other schools that the student is considering for admission.[12]

[11] See Stecklow and Bulkeley (1993) and Daly (1993).
[12] See Gose (2000), Kane (1999) and McPherson and Schapiro (1998) for a more complete discussion of this price- or tuition-discounting issue.

The Data

I evaluate this model using data from the 1995-96 National Postsecondary Student Aid Study (NPSAS 96). The NPSAS is a nationwide survey of undergraduate students conducted by the U.S. Department of Education. It contains detailed information about the composition and quantity of financial aid received by college students as well as various demographic, financial, and opinion data from the students and their families and institutional information from the college the student is attending. This data has not been studied extensively by economists interested in human capital investment. Dick and Edlin (1997) completed previous work using the 1993 wave of this data set. In their article, "The implicit taxes from college financial aid," they consider the fact that families who save for college receive less financial aid and that this is essentially an implicit tax.

The database has 48,389 observations. For our analysis, only the nationally representative sample of undergraduate college freshmen at four-year institutions is included. In addition, the institutions must have a Carnegie Classification[13] of Baccalaureate II or higher and

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[13] The Carnegie Classification was developed by Clark Kerr in 1970, primarily to improve the precision of the Carnegie Commission's research. The classification is NOT intended to establish a hierarchy among higher learning institutions. Rather, the aim is to cluster institutions with similar programs and purposes, and the Carnegie Foundation opposes the use of the classification as a way of making qualitative distinctions among the sectors. *This is taken directly from the codebook for the NPSAS data as provided by the National Center for Education Statistics.* The 1994 Carnegie Classification includes all colleges and universities in the United States that are degree-granting and accredited by an agency recognized by the U.S. Secretary of Education.

Research Universities I:
These institutions offer a full range of baccalaureate programs, are committed to graduate education through the doctorate, and give high priority to research. They award 50 or more doctoral degrees each year. In addition, they receive annually $40 million or more in federal support.

Research Universities II:

the students must have received some financial aid during the 1995-96 school year and have no missing values for the key variables in the analysis. This leaves 2441 observations in the analysis.[14]

These institutions offer a full range of baccalaureate programs, are committed to graduate education through the doctorate, and give high priority to research. They award 50 or more doctoral degrees each year. In addition, they receive annually between $15.5 million and $40 million in federal support.

Doctoral Universities I:
These institutions offer a full range of baccalaureate programs and are committed to graduate education through the doctorate. They award at least 40 doctoral degrees annually in five or more disciplines.

Doctoral Universities II:
These institutions offer a full range of baccalaureate programs and are committed to graduate education through the doctorate. They award annually at least ten doctoral degrees-in three or more disciplines-or 20 or more doctoral degrees in one or more disciplines.

Master's (Comprehensive) Colleges and Universities I:
These institutions offer a full range of baccalaureate programs and are committed to graduate education through the master's degree. They award 40 or more master's degrees annually in three or more disciplines.

Master's (Comprehensive) Colleges and Universities II:
These institutions offer a full range of baccalaureate programs and are committed to graduate education through the master's degree. They award 20 or more master's degrees annually in one or more disciplines.

Baccalaureate (Liberal Arts) Colleges I:
These institutions are primarily undergraduate colleges with major emphasis on baccalaureate degree programs. They award 40 percent or more of their baccalaureate degrees in liberal arts fields and are restrictive in admissions.

Baccalaureate Colleges II:
These institutions are primarily undergraduate colleges with major emphasis on baccalaureate degree programs. They award less than 40 percent of their baccalaureate degrees in liberal arts fields or are less restrictive in admissions.

Associate of Arts Colleges:
These institutions offer associate of arts certificate or degree programs and, with few exceptions, offer no baccalaureate degrees.

Professional and Specialized Institutions:
These institutions offer degrees ranging from the bachelor's to the doctorate. At least 50 percent of the degrees awarded by these institutions are in a single discipline.

Other specialized institutions:
Institutions in this category include graduate centers, maritime academies, military institutes, and institutions that do not fit any other classification category.

Tribal colleges and universities:
These colleges are, with few exceptions, tribally controlled and located on reservations. They are all members of the American Indian Higher Education Consortium.

[14] This may seem like a very small sub-sample of the database. The National Center for Education Statistics at the Department of Education has assured me that with the selection criteria that has been chosen, the remaining number

Following the notation of Dick and Edlin (1997) and the other literature on this topic, I construct a variable called 'Aid Value'. This Aid Value will serve as an index of the value of the financial aid award to the student. The idea here is that students do not value a one dollar loan the same that they value a one dollar grant. This is due to the fact that at some point, the loan needs to be paid back. The loan is worth something to the student, however, since the student generally is thought of as having a discount rate that is significantly higher than the interest rate of the loan, which is generally subsidized. Work-study and other aid do not enter into this measure of Aid Value since a student must give up time and effort to obtain this aid. In addition, work-study and other aid are generally the smallest components of the overall financial aid package. Therefore, the Aid Value variable is a good proxy for the value of the financial aid package to the student. The following measure will be used:

Aid Value = Total Grant Aid + .5(Total Loan Aid)

The coefficient of .5 on the total loan aid is dependent on the current interest rate for loans as well as the estimated discount rate that college students use. The value of .5 used in this paper is the same that is used in McPherson and Schapiro (1991), Edlin (1993), Dick and Edlin (1997), and Bosworth, Carron, and Rhyne (1987). In Bosworth Carron, and Rhyne (1987), this figure is arrived at by calculating the subsidy costs of a student loan at various discount rates and indicating that this is the value of the loan to the student. Feldstein (1995) claims that the coefficient should be about .6 but bases this figure solely on intuition. In this paper, the .5 value is obtained by calculating the present value of the loan to a student borrowing the maximum loan amounts at various discount rates. At a discount rate of 9 percent, a one dollar loan is worth 47 cents; at a discount rate of 10 percent, it is worth 48 cents; and at a discount rate of 12 percent,

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of observations is plausible. Eliminated from the sub-sample are a large number of students from vocational schools and community colleges and those not on financial aid.

the one dollar loan is worth 51 cents. Since the actual discount rate is unknown, .5 is a fairly plausible estimate.

Descriptive statistics of the data used can be found in Table 1. Note that all means are weighted appropriately as specified by the guidelines of the NPSAS 96 Methodology Report issued by the NCES including adjustments for design effects.

Table 1 shows demographic characteristics of the sample. More than half (56%) of the sampled students are female while the vast majority is unmarried (99%) citizens (93%) who attend on a fulltime (92%) basis. Roughly two-thirds of the sample are the only member of their family in college. As for the variables of particular importance to the analysis, on average, students were accepted to three schools. One-quarter (25%) of the students were only accepted to the one school that they are attending. 17% were accepted at five or more schools. The average student receives just over $8,200 per year in total financial aid, over half (55%) of which is grant aid and a third (33%) of which is student loans.

Table 1[a]

Weighted Means and Standard Deviations for Selected Variables – NPSAS 1996

Variable	Mean	Standard Deviation		Variable	Mean	Standard Deviation
Age	18.34	3.44		# Acceptances	3.03	11.47
Fulltime	.92	1.50		1 Acceptance	.25	2.35
Citizen	.93	1.37		2 Acceptances	.22	2.22
Married	.01	.45		3 Acceptances	.21	2.19
Female	.56	2.67		4 Acceptances	.14	1.89
Family in College	1.40	3.35		5+ Acceptances	.17	2.05
No College Sibs	.66	2.55		Total Aid	8204.41	32248.78
1 College Sibling	.28	2.42		Total Grant	4694.38	25880.96
2+ College Sibs	.06	1.28		Total Loan	2235.39	9560.27
Parents' Income	49181.85	191657.07		Total Work-Study	312.65	3373.79
Enrollment Size	15783.97	71456.35		Total Other Aid	962.00	14828.00
Private	.43	2.67		Grant/Total Aid	.55	1.91
Research	.34	2.56		Loan/Total Aid	.33	1.70
Doctoral	.11	1.70		Work/Total Aid	.03	.47
Comprehensive	.33	2.53		Other/Total Aid	.08	1.17
Tuition	8123.02	32926.18		Total SAT	1012.09	1114.08
Fulltime Budget	15275.27	35475.62		In State	.73	2.39

[a] A few words should be said about the variables here. The following variables are dummy variables: Fulltime, Citizen, Married, Female, No College Sibs, 1 College Sibling, 2+ College Sibs, Private, Research, Doctoral, Comprehensive, 1 Acceptance, 2 Acceptances, 3 Acceptances, 4 Acceptances, 5+ Acceptances, and In State. The means listed for these variables represent the percentage of students that fit into this category. For example, 56% of the sample is female and 43% are at a private institution. The Research, Doctoral, and Comprehensive variables again refer to the Carnegie classifications previously discussed. For the analysis, Research indicates either a

Research I or Research II institution, Doctoral indicates either a Doctoral I or Doctoral II institution, and Comprehensive indicates either a Comprehensive I or Comprehensive II institution.

The financial aid offices at private colleges and universities operate in a very different manner than their public counterparts. State governments do not directly subsidize private schools. This is very different from the public schools that are heavily subsidized and can, therefore, offer lower tuition. Table 2 looks at these differences between these two sectors by comparing the means of the relevant variables.[15]

[15] Running t-tests on the differences in the means of the acceptances, financial aid, and SAT variable found that with the exception of '3 acceptances', '4 acceptances', and 'Other/Total Aid', all other differences are significant at the 95% confidence level.

Table 2

Comparing Means between Private and Public Schools and their Students

Variable	Mean for Public	Mean for Private		Variable	Mean for Public	Mean for Private
Age	18.35	18.32		# Acceptances	2.76	3.40
Fulltime	.88	.96		1 Acceptance	.29	.21
Citizen	.91	.96		2 Acceptances	.23	.20
Married	.01	.01		3 Acceptances	.21	.22
Female	.55	.58		4 Acceptances	.14	.15
Family in College	1.39	1.42		5+ Acceptances	.13	.23
No College Sibs	.67	.65		Total Aid	5384.89	11941.53
1 College Sibling	.27	.29		Total Grant	2604.95	7463.79
2+ College Sibs	.06	.06		Total Loan	1853.74	2741.25
Parents' Income	45561.84	53979.97		Total Work-Study	150.64	527.37
Enrollment Size	22250.11	7213.48		Total Other Aid	775.56	1209.12
Private	0.00	1.00		Grant/Total Aid	.51	.61
Research	.46	.19		Loan/Total Aid	.38	.27
Doctoral	.12	.10		Work/Total Aid	.02	.04
Comprehensive	.38	.25		Other/Total Aid	.09	.07
Tuition	3936.92	13671.44		Total SAT	997.17	1031.86
Fulltime Budget	10913.98	21055.91		In State	.87	.55
				Aid Value	3531.82	8834.41

Private schools charge higher tuition, give more aid, and have fewer students than their public school counterparts. In addition, they attract wealthier students from a wider geographic area with higher SAT scores and more acceptances.

Empirical Estimates

The following three charts illustrate the changes in aid composition as the number of schools that a student is accepted to increases. Figure 1 shows that while the average overall aid and average grant aid increase with acceptances, average loan aid stays fairly constant. In fact, the average loan amount ranges between $2169 and $2476 and does not increase monotonically with number of acceptances. Similar stories can be told about Figure 2 and Figure 3.

Figure1

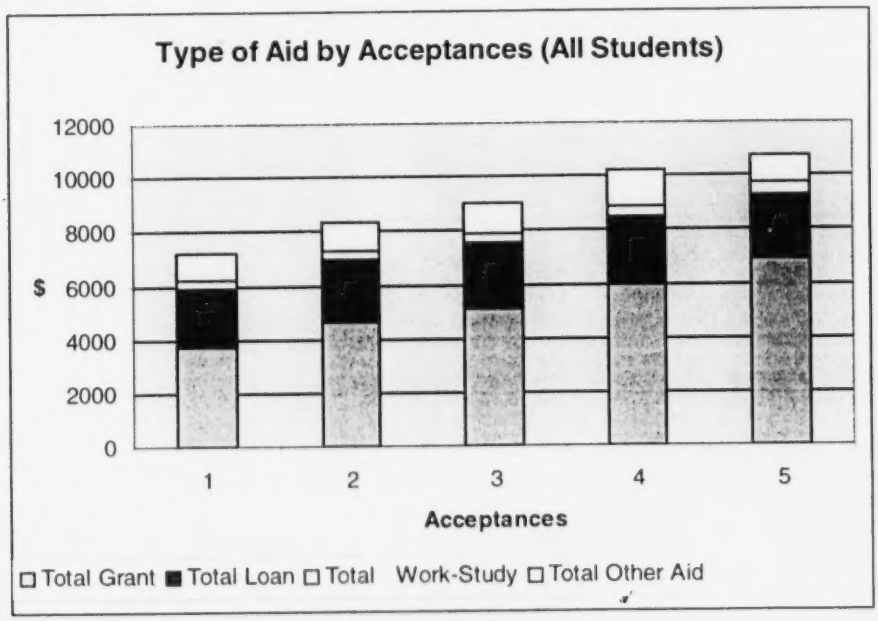


Figure 2

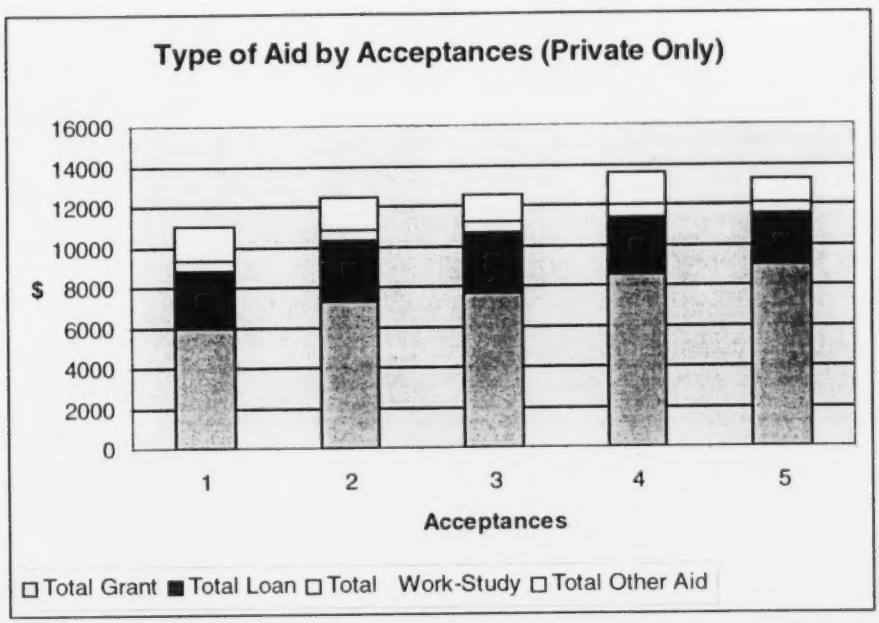
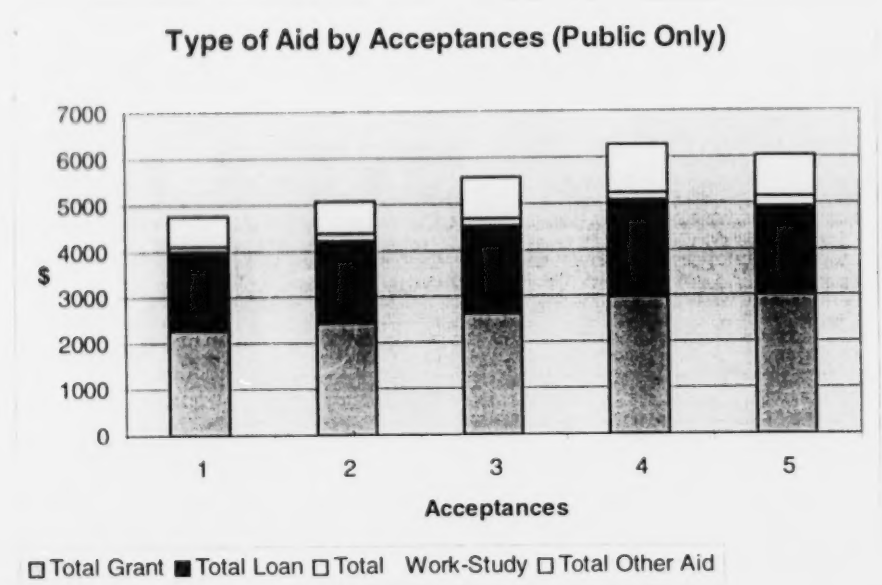


Figure 3



Weighted OLS regressions were run in order evaluate whether students with more acceptances receive better aid packages. Table 3 shows the results for the first three Specifications. In Specification I, total aid is regressed on institutional characteristics (enrollment size, a dummy for whether or not it is a Research institution, whether it is public or private), student characteristics (fulltime status, number of siblings in college, parent's income, SAT score, and, if attending a public school, a dummy variable for living in state or not), and the acceptance variables (2 acceptances, 3 acceptances, 4 acceptances, 5+ acceptances). Specification I includes the 2440 students attending either public or private schools.

Enrollment size, research dummy, number of siblings in college, parent's income, public/private dummy, SAT score, and in state status were all found to be significant at the .05 level of significance. Students with less family income and siblings in college receive more total aid. In particular, for every hundred dollars in additional parental income, the student will receive $4 less in total aid, on average. The type of school also makes a large difference in financial aid awarded. A student attending a private research institution with low enrollment would fair best in terms of aid awarded.

Of particular interest in addressing this model are the dummy variables for number of acceptances. While the 2 acceptances coefficient is not significant at the .05 level, the 3, 4, and 5+ acceptance variables are significant. Compared to a student accepted at only one college, a student accepted at three, four, or five or more colleges receive and additional $646, $1080, and $1233 in financial aid, respectively. In addition, the marginal financial aid awarded from additional acceptances does fall as we increase acceptances. The marginal aid is $434 for the fourth acceptance and a mere $153 for the fifth acceptance.

Specifications II and III show the results for students attending public and private schools, respectively. For the public school students, enrollment size, research status, parent's income, and in state status remained significant, as well as the 4 acceptances and 5+ acceptances variables. For the private school students, the research status, number of college-aged siblings, parent's income, SAT score, and 3, 4, and 5+ acceptances variables remained significant.

In each of these three regressions, the joint hypothesis of significance of the coefficients on the number of acceptances variables can not be rejected.[16]

[16] In Specification I, the F value is 5.69. In Specification II, the F value is 2.49. In Specification III, the F value is 3.24. All of these values are significant at the .05 level.

Table 3[b]

Regressions of 1995-1996 Total Aid for Freshmen at 4-year Institutions

Independent Variables	Public and Private (I)	Public Only (II)	Private Only (III)
Intercept	**3940.42**	**8009.64**	**4568.08**
	(5.72)	(12.41)	(4.09)
Enrollment Size	**-.04**	**-.05**	-.03
	(-3.78)	(-4.46)	(-1.33)
Research	**2672.74**	**2669.36**	**3141.02**
	(9.25)	(10.33)	(5.14)
2 Acceptances	273.89	-59.83	977.87
	(1.00)	(-.23)	(1.84)
3 Acceptances	**646.24**	341.55	**1256.86**
	(2.32)	(1.28)	(2.42)
4 Acceptances	**1080.44**	**654.67**	**1673.25**
	(3.41)	(2.11)	(2.90)
5+ Acceptances	**1232.98**	**692.70**	**1663.36**
	(4.09)	(2.18)	(3.22)
Fulltime	641.33	187.77	1614.18
	(1.87)	(.65)	(1.92)
1 College Sibling	**555.80**	255.32	**849.16**
	(2.62)	(1.22)	(2.24)
2+ College Siblings	**1894.05**	**1772.66**	**2338.73**
	(4.72)	(4.41)	(3.30)
Parent's Income	**-.04**	**-.03**	**-.06**
	(-14.94)	(-8.77)	(-12.65)
Total SAT	**3.29**	-.62	**7.02**
	(6.39)	(-1.15)	(8.05)

In State * Public	**-1787.22** (-4.80)	**-1914.98** (-6.84)	
Private	**5136.61** (13.00)		
Adjusted R-Squared	.4029	.1893	.1878
Observations	2439	1225	1214

[b] Coefficients in bold are significant with $\alpha = .05$. The omitted category is a student who is attending part-time at a non-research institution with no siblings currently enrolled in college and who was accepted at only that one institution.

Table 4 presents the results for similar regressions except now we are using Aid Value as the dependent variable. Note that in Specification IV, most of the same coefficients from Specification I remain significant. Again here take special notice of the acceptance variables. Students accepted at three, four, and five or more institutions receive a premium of $560, $997, and $1339 in additional financial aid, respectively. In each of these three regressions, the joint hypothesis of significance of the coefficients on the number of acceptances variables can not be rejected.[17]

We can also observe additional differences in the way in which public and private schools operate their financial aid departments. The first thing to notice is that multiple acceptances appear to be considerably more influential with private schools than for public schools. This is reflected both in the significance and the magnitude of the coefficients. In addition, the coefficient on the SAT score in the private-school regression is very indicative of a phenomenon discussed in the popular literature known as tuition- or price-discounting, whereby schools will base some portion of financial aid awards on ability, as opposed to need as they

claim. The concept of price-discounting is discussed in greater detail earlier in this paper. For private schools, a 100 point increase in SAT score will yield an $800 increase in financial aid. For public schools, there is not a statistically significant change in aid for higher SAT scores.

Table 4[c]

Regressions of 1995-1996 Aid Value for Freshmen at 4-year Institutions

Independent Variables	Public and Private (IV)	Public Only (V)	Private Only (VI)
Intercept	334.86	**4334.16**	845.71
	(.60)	(8.88)	(.91)
Enrollment Size	**-.03**	**-.03**	**-.04**
	(-3.41)	(-3.45)	(-2.05)
Research	**1763.50**	**1843.31**	**2121.52**
	(7.47)	(9.43)	(4.18)
2 Acceptances	192.67	26.02	669.63
	(.86)	(.13)	(1.52)
3 Acceptances	**559.54**	154.28	**1286.13**
	(2.46)	(.77)	(2.99)
4 Acceptances	**997.20**	**576.81**	**1632.48**
	(3.85)	(2.46)	(3.41)
5+ Acceptances	**1338.56**	**482.36**	**2134.09**
	(5.44)	(2.01)	(4.97)
Fulltime	**604.07**	126.32	**1782.27**
	(2.16)	(.58)	(2.55)
1 College Sibling	**339.56**	250.59	401.28

[17] In Specification IV, the F value is 9.50. In Specification V, the F value is 2.33. In Specification VI, the F value is 7.13. All of these values are significant at the .05 level.

	(1.96)	(1.58)	(1.28)
2+ College Siblings	**1573.66**	**1340.65**	**2259.41**
	(4.80)	(4.41)	(3.84)
Parent's Income	**-.05**	**-.03**	**-.06**
	(-20.95)	(-14.99)	(-16.44)
Total SAT	**4.40**	.45	**8.03**
	(10.45)	(1.11)	(11.11)
In State * Public	-357.61	**-543.45**	
	(-1.18)	(-2.57)	
Private	**5048.80**		
	(15.64)		
Adjusted R-Squared	.4274	.2326	.2602
Observations	2439	1225	1214

[c] Coefficients in bold are significant with $\alpha = .05$. The omitted category is a student who is attending part-time at a non-research institution with no siblings currently enrolled in college and who was accepted at only that one institution.

Conclusions

These results support the predictions of the theory that an increase in acceptances increases the financial aid for the student. In addition, these results indicate that the financial aid process is one that needs to be analyzed not merely from the strategic perspective of the college, but also from the student's strategic perspective. A student and her family have the ability to place themselves in a more advantageous position by acting strategically in this process. The results suggest that there is some optimal number of schools to which a student should apply. Many students are probably currently 'under-applying' due to the shortage of information available discussing strategy from their perspective. There is a wide information gap between the colleges and the students' families when it comes to financial aid. The colleges have professionals who specialize in strategic financial aid over thousands of students and many years while the student's family many times has no other observations to learn from.

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